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of the first (1637) edition of Descartes' *Géométrie*, which, through the courtesy of Professor C. I. Palmer, the present writer examined two years ago, contained on the first leaf the signature of Letenneur and the following inscription:

"Offert à Monsieur J. J. Sylvester Souvenir affectionné de son dévoué Chasles. Feb. 1847."

Further on appears the entry:

"To Dr. Halsted, with the kind regards and all good wishes of J. J. Sylvester."  
2d May 1893.

And at the end of the book is pasted a small sheet containing the following note written by Halsted himself:

"This book, *La Geometrie*, treasured in the family of Letenneur as gift of the author and by the great geometer and historian of geometry M. Chasles as the gem of his collection, was given by him to Sylvester as recompense for a great service and by Sylvester to his favorite pupil Halsted, by whom it was conveyed to Professor C. I. Palmer.

"The signature of Letenneur with his minute but characteristic rubric, that of Chasles after his glowing words and of Sylvester after his gracious lines

Make the book priceless.

G. B. H."

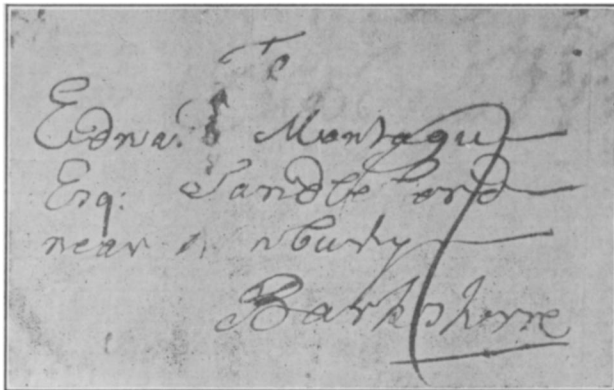
The spirit of Halsted has fled—gone to meet face to face the great masters he admired—Saccheri, Lobachevsky, Bolyai.

## AMONG MY AUTOGRAPHS.

By DAVID EUGENE SMITH, Columbia University.

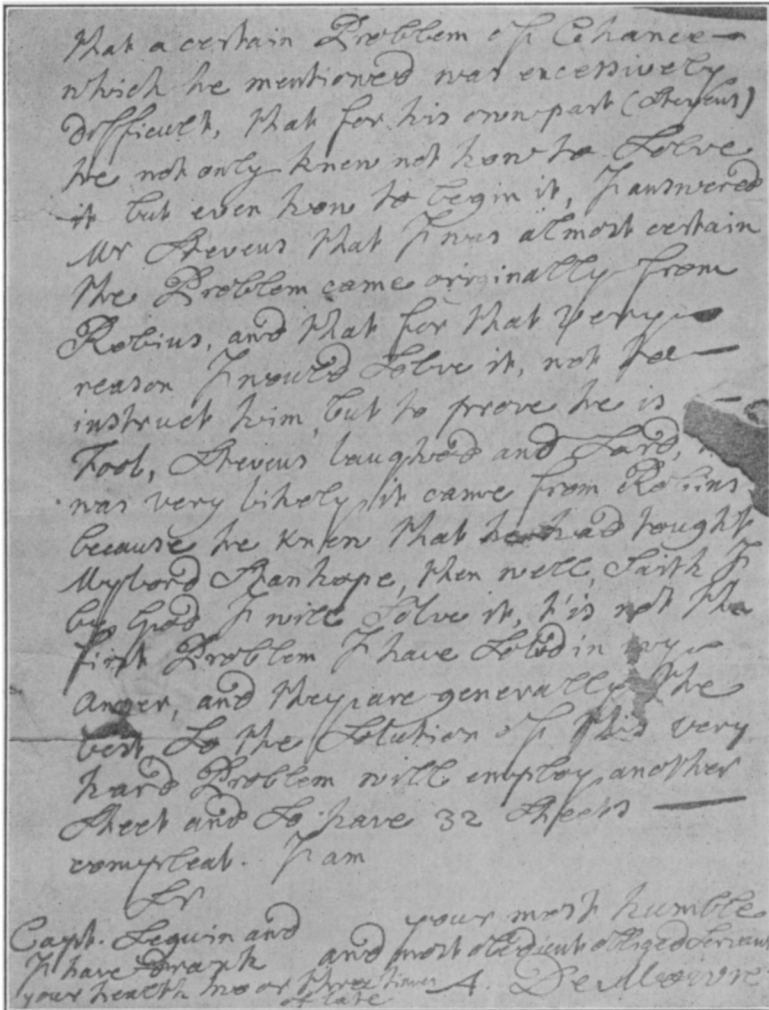
### 28. DE MOIVRE EXPRESSES HIMSELF.

Of all the mathematicians who added to the reputation of England in the closing years of Newton's life, no one arouses a more sympathetic interest than Abraham De Moivre, author of the well-known *Doctrine of Chances*,<sup>1</sup> of the even



<sup>1</sup> London, 1718; second edition, London, 1738; third edition, posthumous, 1756.

more notable *Miscellanea Analytica*,<sup>1</sup> of a work on annuities, and one on series, and of various monographs on geometry and the Newtonian calculus. Born in France in 1667, he studied mathematics as a boy under Ozanam, one of the best teachers in Paris, and, at the age of eighteen, went to London in order to find



That a certain Problem of Chance —  
which he mentioned was excessively  
difficult, that for his own part (De Moivre)  
he not only knew not how to solve  
it but even how to begin it, answered  
Mr. De Moivre that he was almost certain  
the Problem came originally from  
Robins, and that for that very re-  
ason he would solve it, not to  
instruct him, but to prove he is  
Tob, De Moivre laughed and said,  
was very likely it came from Robins,  
because he knew that he had taught  
Mylord Stanhope, then well, said to  
him, God, I will solve it, it is not the  
first Problem I have solved in my  
anger, and they are generally the  
best. So the solution of this very  
hard Problem will employ another  
sheet and so have 32 sheets —  
complete. I am  
Yr  
Capt. Leguin and  
I have drawn and most obediently  
your health most humble  
at late A. De Moivre

greater religious freedom, and perhaps greater adventure. Although compelled by narrow circumstances to forego the ideal life of a student, he became a member of the mathematical group of which Newton was the leader, and was recognized as a man of genuine ability. He made his living by teaching mathematics and by solving such problems as were brought to him by the curiously inclined, but such an existence is always a precarious one, and De Moivre's later years were

<sup>1</sup> London, 1730.

those of a rather lonely old man whose intimate friends had long since departed this world. He frequented Slaughter's famous coffee house in St. Martin's Lane, and that he imbibed something besides the drink from which the place received its name is not to be wondered, considering the period in which he lived and the circumstances which surrounded him.

Among my autographs is the last page of what was originally a four-page letter written by him to Edward Montague, a member of one of the most prominent of the noble families of England.<sup>1</sup> The letter is here reproduced in facsimile, being more legible than is usually the case with those that have come down to us from that period.

In this letter De Moivre speaks of a Mr. Stevens, probably Henry Stuart Stevens.<sup>2</sup> He also refers to a certain problem arising in the then popular game called "Hazard." This problem does not appear in the first edition of De Moivre's celebrated *Doctrine of Chances*, but it is No. XLVI of the edition of 1738. Todhunter,<sup>3</sup> in his *History of the Theory of Probabilities*, quotes De Moivre as saying:

"After I had solved the foregoing I spoke of my solution to Mr. Henry Stuart Stevens, but without communicating to him the manner of it. As he is a gentleman who, besides other uncommon qualifications, has a peculiar sagacity in reducing intricate questions to simple ones, he brought me, a few days after, his investigation of the conclusion set down in my third corollary; and as I had occasion to cite him before in another work, so I here renew with pleasure the expression of esteem which I have for his extraordinary talents."

Now by reference to the letter itself and to the above quotation and others from De Moivre, it is possible to reconstruct the probable facts of the case. This particular problem XLVI is "to find at Hazard the gain of 'the box' for any number of games divisible by 3," and is first given in the edition of 1738. In his *Miscellanea Analytica* of 1730, De Moivre refers to it, however, saying: "Septem aut octo abhinc annis D. Stevens Int. Templ. Socius, vir ingenuus, singulari sagacitate præditus id sibi propositum habens ut problema superius allatum solveret, hac ratione solutionem facile assecutus est, quam mihi his verbis exhibuit."

Now seven or eight years before 1730 would be about 1722-1723. But in the 1738 edition of the *Doctrine of Chances* De Moivre says that he solved the problem about twelve years before, which would be about 1726 (provided the revision was made the year the book was printed, which was probably not the case.) After De Moivre solved the problem, perhaps about 1724, he probably showed the solution to Stevens, who gave him a better one. We then have the date of the letter about 1723 or 1724.

<sup>1</sup> He was born in 1697 and was admitted as a Fellow of the Royal Society in 1746, having been elected the preceding year. He died in 1761. His signature may be found in facsimile in a book of the Royal Society, published in London in 1912.

<sup>2</sup> Born in 1707; died in 1782. He was elected to the Royal Society in 1740 and was admitted as a fellow the following year.

<sup>3</sup> Isaac Todhunter, born in 1820; died in 1884. He was successful as a writer of textbooks and his two historical contributions rank very high.

It should be stated, however, that it is by no means certain that the problem referred to in the letter is No. XLVI of the second edition of the *Doctrine of Chances*. It may be some other problem to which we have no certain way of attaching Stevens's name.

Coming now to the letter itself, it seems that the problem was given to De Moivre by Stevens about 1724; that De Moivre said that the problem very likely came originally from one Robins, probably Benjamin Robins,<sup>1</sup> to which opinion Stevens agreed; and that De Moivre had a rather poor opinion of Stevens at that time. The Lord Stanhope mentioned as having been tutored by Robins was doubtless Philip Dormer Stanhope, fourth Earl of Chesterfield, the well-known author of Chesterfield's letters, whose education was chiefly received through private instructors.

The reference in the letter to having worked out some of his best solutions "in my anger," might better, no doubt, have read "in my cups." The Captain Seguin, referred to in the post scriptum, is not mentioned in the standard works on biography. The "32 Sheets compleat" may refer to the revision of the *Doctrine of Chances*, already under way, or possibly to the *Miscellanea Analytica*. Books were not written in a hurry in those days.

The story, so often told, that De Moivre decided to sleep fifteen minutes longer each night, until finally he never awoke, is probably based upon some pleasantry of his in connection with his disease of somnolence which finally ended a life that had become quite unendurable, even with the help of such libations as were then poured out so freely.<sup>2</sup>

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## QUESTIONS AND DISCUSSIONS.

EDITED BY C. F. GUMMER, Queen's University, Kingston, Ont., Canada.

### DISCUSSIONS.

The discussions which follow give cause for special satisfaction in that two of them are in some sense replies to previous papers, while the third closes with a question inviting further investigation. It would seem, from such indications, that this department is at times answering its purpose as a department of discussion.

The letter of Brigadier General Bixby, though it arises out of Professor Candy's article on mechanical solution of equations, is concerned more specifically with graphical solution, and emphasizes in a suitable way the great and increasing importance of this problem. In particular, the writer argues, from his experience, the advantages of Lill's graphical method, and recalls his own attempt in 1879 to make this method known to English reading students, by means of a pamphlet.

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<sup>1</sup> Born at Bath in 1707; died at Fort St. David, Madras, in 1751; author of *Mathematical Tracts*, printed posthumously in 1761.

<sup>2</sup> I am indebted to Mr. Jekuthial Ginsburg for assistance in tracking down some of the facts in connection with this interesting letter.